Vol. 1. No. 1A

PRICE TEN CENTS.

# The Automobile

AN ILLUSTRATED MONTHLY JOURNAL.

Published at 150 Nassau Street.



NEW YORK, SEPTEMBER, 1899.

...t New York Post Office
...nd-class matter.


CENTRAL PARK IN THE NEAR FUTURE.

### Our Front Page Illustration.

While our front page shows an ideal park scene, originated by our artist, yet every carriage shown therein is in actual use. It is a representative group of the automobile carriages that have been placed before the public by American builders. The variety in style and character of these automobiles is therein exemplified. It would be impossible to show each make of carriage in one illustration, yet the automobile expert will be able in this picture to pick out the hydrocarbon, the steam and the electrically-propelled vehicles.

In subsequent issues automobiles for other uses will be shown in like excellence as regards artistic effect and accuracy of detail. Foreign styles of automobiles will also receive attention in the illustrations, which will form an important part of every issue. Special vehicles will be shown, with particular reference to their propelling motors and controlling devices, which will be described so as to acquaint the prospective user with the mechanical part of the vehicle.

### Mt. Washington by Automobile.

The feat of making the ascent of Mt. Washington in an automobile has just been accomplished by Mr. F. O. Stanley, of Newton, Mass. The trip from Newton to Pinkham Notch, a distance of about two hundred miles, was made by Mr. and Mrs. Stanley in this automobile at a rate of about eighteen miles an hour. The distance from this point to the summit is something more than ten miles on a rather even grade, which would not be so bad for a short distance, but it ends only at the top.

The carriage used by Mr. Stanley is a steam carriage, using gasoline for fuel. Two gallons are said to have been required to make the ascent, which, at the usual price of seven or eight cents a gallon, would not make the expense very heavy, unless water came high, in price, of course, as it has in some sections of the country the past dry season.

This trip was undertaken as a pleasure trip by way of a vacation, and such feats as this will certainly give zest to the trip. From Mt. Washington they will go up into Maine, looking for more mountains or worlds to conquer.

### From Kokomo to Brooklyn.

If the surest test of an automobile is practical use, Dr. Webber's carriage has been well tested. This carriage made the run from Kokomo, Ind., to Brooklyn, arriving at the doctor's residence after twenty-one days on the road. The distance given is ten hundred and fifty miles, and actual running time ten days.

From Buffalo to Syracuse good roads were reported, and the highest speed of twenty miles an hour was attained here. The average for this distance was eighteen and four-tenths miles per hour. The carriage left Kokomo in charge of Messrs. Elwood Haynes and E. L. Apperson. They proceeded to Cleveland and thence along the shores of Lake Erie to Buffalo. Thence their route lay along the line of the New York Central Railroad and through the Mohawk Valley to Albany, and down the left bank of the Hudson to New York and Brooklyn.

The carriage, which is shown in the accompanying illustration, awakened a great deal of interest along the route. With one or two exceptions, the trip was made without runaways, which are the unpleasant accompaniments of such trips. The worst hill of the trip reported is in Ashland county, Ohio, but no difficulty was experienced in the ascent.

The automobile is a doctor's phaeton, with seat for two, covered by an ordinary buggy hood. It weighs 1,500 pounds and is operated by a double-cylindered gasoline motor of five and three-fourths horse power. The cylinders are so balanced as to reduce vibration to a minimum. To transmit the power, steel cut gear wheels are used, there being no chains. The wheels are of the Sarven pattern, with hickory spokes and heavy pneumatic rubber tires. The automobile was built at the Kokomo factory of The Haynes-Apperson Company, who manufacture an extensive variety of such vehicles.

FROM KOKOMO TO BROOKLYN.

### New Types Automobile Carriages.

Nearly as great variety in styles of automobiles has been undertaken by manufacturers as is to be found in the ordinary horse carriage. Some radical changes are noticeable from the general design of such vehicles, but in the main the general outlines have been retained. The electric brougham shown in Fig. 1 is from the Riker company's factory. It has solid tires, wood wheels, double motor equipment, with storage battery for a twenty-five mile runs. The controller gives three speeds ahead and two in running backwards.

The columbia electric stanhope is shown in Fig. 2. A number of important features are noticeable. The dash is rounded, the controlling devices are placed at the left and the frame is steel, with steel wheels and pneumatic tires. The motor and driving gears are securely enclosed, so that the vehicle may be washed down without injury to the motive power.

The doctor's phaeton shown in Fig. 3 is from a photograph of a carriage in daily use in New York City. It is an Automobile Company of America's product, equipped with hydrocarbon motors. The space in front of seat, as will be noticed, is not obstructed by controlling devices. Lights, gong and all necessary devices form a part of the equipment.

A steam stanhope of the Locomobile company is shown in Fig. 4. It is a steam-propelled vehicle of very neat and light appearance. The weight of the carriage is about four hundred pounds. The speed can be regulated by driver from one to forty miles an hour. The mechanical equipment is very simple, and it is claimed that any one can operate it. Water and fuel can be carried for a long run, or are easily obtained in any town or village. The vehicle can be run forward or backward at the will of the driver. The carriage is guided by a lever, which turns the forward wheels. Pneumatic tires, ball-bearing axles, springs, etc., guarantee comfort to the occupant.

The carriage shown in Fig. 6 is designed to carry two persons. It is a Grout hydrocarbon automobile. One of the novel features is the electric lights supplied by a small dynamo, which also furnishes current for the ignition spark of the motor. The motor has two cylinders, and one or both may be used as required. The usual method of guiding the carriage by means of the front wheels is employed.


FIG. 1.—ELECTRIC BROUGHAM.


FIG. 2.—ELECTRIC STANHOPE.

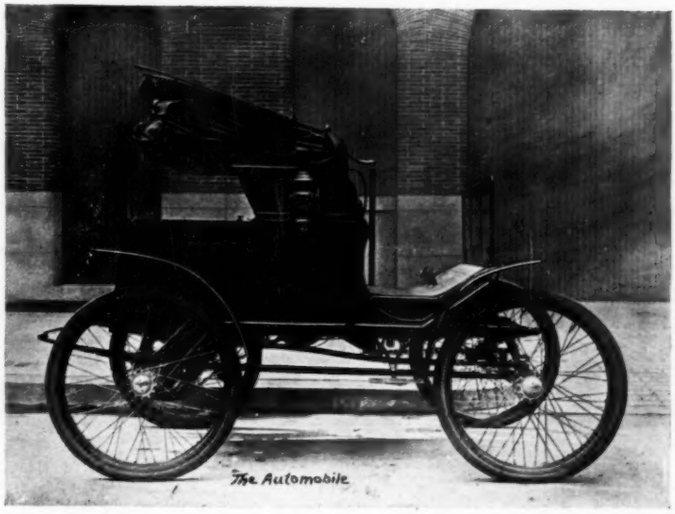


FIG. 3.—HYDROCARBON PHAETON.


FIG. 4.—STEAM STANHOPE.

FIG. 5.—ELECTRIC DOS A DOS.

FIG. 6.—HYDROCARBON STANHOPE.

NEW TYPES AUTOMOBILE CARRIAGES.

## The Management of Electric Vehicles.

By GEORGE T. HANCHETT.

Rumor has it that it is becoming a fad in polite society to be able to manage an electric vehicle. The elite of Newport are said to be taking lessons, and apropos of this search after knowledge, it may be that a short discussion of the matter of managing an electric vehicle with a view to saving the battery and motors, as well as the actual mechanical manipulation of the levers will be interesting.

The electric vehicle as at present constructed has for its driving mechanism a storage battery, one or more motors and a compound switch or controller. There are usually provided within easy access of the operator a controlling handle, a reversing handle, by which the direction of the vehicle can be reversed, the brake, bell, and switches for turning on the electric light, etc. The battery or source of energy is capable of giving forth a certain quantity of energy, and this quantity in its results varies according to the way in which it is taken out. For instance: If it is called for in large flushes of current the battery will respond, but the total available output of the battery will be less than if the current is taken out in more moderate amounts.

Storage batteries are commonly rated in ampere hours; that is to say, the discharge in amperes that will obtain for an hour represents the ampere hours. The discharge in amperes that will obtain during two hours multiplied by two, represents the ampere hour discharge, thus a cell of 100 ampere hours capacity may give 30 amperes for three and one-third hours. If, however, an attempt is made to discharge it at 40 amperes it is possible that it may succeed in giving this current for only two hours, a total of 80 ampere hours and with a demand for 50 amperes, the total ampere hours would be less, therefore we may lay down as a fundamental rule that to make a long trip with an electric vehicle with a single charge of battery, heavy flushes of current are to be avoided.

A heavy flush of current at the motors may be induced in a number of ways; quick starts, especially on grades, conduce to these excessive charges from the battery; in short, any case where power is suddenly required of the motors. Attempts to start while the wheels are stopped by any obstacle, or bound by the brakes, are similarly detrimental, not only to the charge within the battery at the time, but the actual life of the battery itself, which is none too long at the best.

Another important point in the management of electric vehicles is the starting and stopping. The preliminary acceleration of full speed costs twice as much and often more power as the subsequent energy at the full speed thus once attained. The first application of the energy is to give the vehicle its momentum and to overcome the friction necessary to drive it at a certain speed. As soon as the momentum is obtained the motor drops to the suitable current that overcomes the friction which obtains. Therefore, if a long trip is to be made, the fewer starts and stops that are incurred the greater the economy of the charge, and the further the vehicle will run on a given charge.

Another point in which the manager of an electric carriage must be careful is the use of the brake. The less the brake is used the better. It is very enticing to dash up to your destination at high speed and suddenly stop, but it is much more economical to shut off the current a little earlier and coast up to the stopping place. The brakes used consume heat; heat is energy, and the storage battery has to pay for it. Hence use the brake as little as possible.

There is usually provided on the vehicle an instrument known as an ammeter, which measures the ampere discharge at the batteries. By consulting this instrument at any time the manager of the vehicle can tell whether or no he is calling for excessive current, and knowing the capacity of his batteries he will know what current is moderate, what is large and what is excessive.

If long mileage is to be obtained with a single charge, it is necessary to run the motors at their most economical speed; that is to say, at their full capacity. The electric motor is very similar to other devices in respect to efficiency. At a light load its efficiency may be as low as 40 per cent.; that is to say, 40 per cent. of the electric energy supplied at the motors appears as useful power at the wheels to drive the vehicle. When the motor is fully loaded the efficiency may rise to 80 or 85 per cent., and in the larger sizes of motors possibly more. Therefore, it follows that if the capacity of the storage battery is not exceeded, and a long run is desired to be made, the motor must be kept as nearly as possible at its full speed and power. On over loads the efficiency of the motor drops again. It is necessary to depart from the above conditions continually in driving a motor vehicle, but they should be ideals to be aimed at. With poor management a motor vehicle that should make a run of 50 miles may make less than 30.

There is also provided on most motor vehicles an instrument known as a voltmeter. This instrument measures the electrical pressure at which the batteries supply their amperes, and its indications form a very accurate criterion of the condition of the batteries. The batteries should give two volts per cell. Thus, in a battery containing 40 cells the voltage should be 80. On a full new charge the voltage may rise as high as 2.2 volts per cell, thus making the initial starting voltage 88. When the cells are discharged as low as 1.8 volts per cell, they should be considered discharged, for although they are capable of supplying additional power at the reduced voltage, the power which must be put back in them to restore them to their original condition is vastly out of proportion to the power that can thus be taken from them.

A battery of cells should never be left in a discharge condition. If this is done an action which is known as sulphating occurs; that is to say, the acid attacks the plates and forms a corrosive salt, which is detrimental to the cell, and moreover the process is detrimental to the plates. Sulphating can in a measure be removed by giving the cells a heavy overcharge, but the cells should never be allowed to reach such a condition. A sulphated cell is very deceptive with regard to the voltage indications. It is likely to indicate a much higher voltage, at a state of almost complete discharge, than a cell in good order would do.

It is never well to charge the battery inside the vehicle. Means are provided in many vehicles for doing this, but the offensive fumes which are given off in charging are very detrimental to any metal work with which they may come in contact. The cells should be removed when charged. If in handling the cells any of the fluid is spilt from them, especially when they are in a charged condition, it may be replaced with clean water. An attempt to use acid and water may result disastrously. It is far better to have the electrolyte a little too weak than a little too strong.

Storage batteries are in fact the horse of the vehicle, and every effort should be made to learn their frailties and to humor them in precisely the way the horse is humored. Like the horse, if called upon to do an excessive amount of work they will do it uncomplainingly, but at the expense of their life. In this fact lies great danger in the management of storage batteries. They perform severe tasks without apparent exertion, but presently they will fail to respond altogether, the positive plates being possibly bent or short circuited and destroyed.

The items of expense in the running of a motor vehicle are: Electricity for charging purposes, maintenance of positive plates of battery, general maintenance of the vehicle, storage, and minor charges. The first two of these items are the most severe, and easily amount to 75 per cent. of the total expense. For the rest of the vehicle it may be said that the maintenance compares with the maintenance of an ordinary carriage and harness.

For a two-seated vehicle weighing from 1,000 to 1,500 pounds, capable of maximum speed of 15 miles an hour at a radius operation of 40 miles, the total expense is about $25.00 per month, the vehicle being in service every day.

## Automobile Exhibit.

For the purpose of advancing the interests of the automobile in the British Isles an exhibit of automobiles is to be made at Dover about the middle of September.

# Club News and Views.

### The Automobile Club of America.

A national automobile club is assured. A charter has been granted, and complete organization will be perfected at its first meeting, to be held some time this month. The credit for the club is due to the incorporators, Messrs. George F. Chamberlin, acting president; Homer W. Hedge, secretary; Charles R. Flint, George Moore Smith, Whitney Lyon, W. H. Hall, Dr. Frank C. Hollister and W. E. Busby. Applications for membership have been rapidly enrolled, which will afford the membership committee an abundance of work when it shall be appointed.

It has been proposed that the club membership be limited to four hundred, but as the industry grows the limit may be changed to meet the changed conditions. As the club is national in character, its members will be distributed throughout the United States. There will be a limited number of honorary members. The annual dues have been placed at twenty-five dollars, with the initiation fee of fifty dollars.

The purpose of the club is to maintain a social organization devoted to the sport of automobilism and to further its interests throughout this country, to arrange pleasure runs and road contests, and in general to increase the popularity and to advance the use of automobiles. The interests of American automobiles in international contests will be cared for by this club and it will undoubtedly become the repository of such trophies as American vehicles shall secure, or such as shall be offered by Americans for international competition.

The subject of a club-house is already under consideration. The special requirements of an automobile club-house will not be overlooked. A stable nearby will be secured where the automobiles of the members can be cared for, charged or kept for use. The club will thus be enabled to extend every courtesy to visitors from foreign clubs.

### Boston.

Reports from Boston show that the automobilists are wide awake and looking after their interests. The city fathers look upon them yet with suspicion, and consider the side streets good enough for such "new-fangled" inventions. To convince them of the harmless nature as well as the great advantages of the self-propelled vehicle, is one of the purposes of the "Motor Vehicle Club." The first meeting is to be held September 5th, at the United States Hotel. Officers will be elected and permanent organization effected. It has been suggested that the club hold certain meetings during the winter, at which lectures would be given on subjects relative to the construction and operation of automobiles. Such subjects as springs, wheels, roller bearings, steam, hydro-carbon and electric motive power would be discussed. The social features of the club will not be neglected.

### Chicago.

An automobile club is an assured thing in Chicago. The number of automobiles in the city is not as great as in many eastern cities, but the enthusiasm is all here. As soon as those interested get settled into their accustomed circles after the midsummer relaxation, the automobile club will be taken hold of and permanent organization effected. The social as well as commercial features will be cared for in the plan of the club.

### St. Louis.

From St. Louis no automobile club has been reported, and few carriages are owned at the present time in that city. The interest in the subject is, however, as intense as in the larger cities.

### Philadelphia.

While Philadelphia has no automobile club there is considerable talk of some sort of an organization for the protection and advancement of the automobile interests. The city council talks of an annual ten-dollar tax on each vehicle, and the park commissioners have barred them from the parks. The various kinds of automobiles are daily represented on the streets and probably we shall soon hear of a club.

### The Automobile Club of France.

The Automobile Club of France was organized in 1895 for the purpose of encouraging the building and use of the automobile. Within a year it had enrolled nearly five hundred members, most of whom were wealthy citizens of the republic. Through various local and international competitions and congresses the club has greatly advanced the interests of the self-propelled vehicle in Europe. The membership of the club has continued to increase and now at its headquarters in the Place de la Concord, Paris, are to be found many of the prominent citizens of France.

### The Automobile and Newport.

Newport has taken a great interest in the automobile, and it has spread rapidly among society folk, but it is a mistake to call it a craze, even though cottagers never took to anything before with quite such an avidity. Automobiling at Newport long since passed from the realm of the mere fad to that of real practicability, and it can be said that—at least for the uses of society—the horseless carriage has come to stay.

It has been impossible to obtain automobiles as fast as they were wanted. This has been unfortunate, and as near as the unfortunates could get to an automobile was to get on the waiting list. Those in use have been of many kinds; of both American and foreign manufacture. The American vehicles have been the more popular, and have been in as great a variety of styles as those imported.

### Automobile Accidents.

It is not surprising that we hear now and then of automobile accidents. These accidents are made the more prominent from the fact that, as a new vehicle, in which everyone is interested, they are under the closest scrutiny. The accidents of the horse are given little prominence at the present time, yet such accidents are of daily occurrence from runaways, careless driving, imperfect roads, etc. Most of the accidents reported from abroad have been in speed contests, but the number is not large as compared with the accidents on our race tracks. Greater familiarity with the control of the automobile will lessen the liability of these accidents. It has come to stay, is daily more in evidence on our streets, and is yet only beginning its career.

### Success of Clubs.

The success of the automobile clubs of France and Great Britain has awakened on this side of the Atlantic an interest in similar organizations. Local pleasure clubs in individual or club contests for trophies offered will stimulate competition in the production of vehicles for both long and short-distance riding. National and State organizations will be necessary for the proper protection of the rights of the automobile just as the rights of the bicycle has been maintained through its national association. A movement has already been started in this direction.

### An Autumn Tour.

The Automobile Club of Great Britain has planned the following autumn tour: Saturday, September 16, from London to Folkestone, a distance of 77 3-4 miles; next day, the members will cross to Boulogne, to witness the finish of the Paris-Boulogne race, returning the same day; Monday, from Folkestone to Canterbury, Minster, Sandwich and again to Folkestone; on Tuesday to Dover for the opening of the motor car show and back to Folkestone, and Wednesday a return to London.

# The Automobile

Published at

150 NASSAU STREET, NEW YORK,

on the first of each month.

BY THE E. L. POWERS CO.

SUBSCRIPTION PRICE.

North America - - - - - - - $1.00

Foreign - - - - - - - - - 2.00

Advertising Rates upon Application.

Address communications to

THE AUTOMOBILE, 150 Nassau St., New York.


CONTENTS.



## Salutatory.

No product of man's inventive genius and mechanical skill in recent time has attracted more general attention than the automobile in its many forms. It has drawn to its aid millions of capital, preempted the factories of old-established industries, and caused the erection of new in nearly every section, attracted to its shops a host of inventors and mechanics who are as yet unable to supply the demand for the self-propelled vehicles. This wonderful success, which is evident on both sides of the Atlantic, has shown, we believe, the demand for a paper devoted exclusively to its interests. The design of the paper is to present in short concise articles the latest information obtainable respecting the various uses of these vehicles. Giving attention to such details of construction, care and maintenance as will interest the user, we aim to make it a valuable medium for the owner and prospective owner of the automobile. It will contain articles by adepts in the art of handling these vehicles, by those whose success in the operation and in experiments with various forms are capable of judging the advantages of the particular vehicle for a particular purpose. Accounts of tours and reports of contests will be regularly chronicled. In short, we shall endeavor to place before our readers the kind of information they desire, in as far as we can determine it. We shall be pleased to receive suggestions and correspondence from our readers upon any subject that will advance the interests of the paper. The publication is to be characteristic of the field it represents; a twentieth-century publication, well-illustrated and up to date in every respect.

### Steel vs. Wood Wheels.

On the automobile now in use both the steel bicycle type of wheel and the wood wheel are used. There seems to be a difference of opinion among builders as to the relative advantages of these types of wheel. Both have their advocates, and it would be useful were tests made to determine exact information in this matter. The great weight of the electric automobile with its storage battery requires a wheel of commensurate strength. The load of the gasoline automobile is not inconsiderable, and several failures of wheels have been reported during the past week. Practical use is of course a sure test of any wheel, but the manufacture of either kind requires an expensive equipment, so that previous tests would be a matter of economy. Record of miles run by different wheels and upon different vehicles is information which will in time be available. A wheel that on one vehicle may prove suitable will possibly on another prove quite the contrary. Popular taste may also influence the kind of wheels used.

### The Automobile and Good Roads.

With the general use of the automobile good roads have got to come. The campaign in this direction that was started years ago has produced some good results. This is evident in the more recent laws enacted by the legislatures of some of the states, which provide for aid from the state in the construction of county roads under the supervision of the state engineer. The press, by the dissemination of knowledge respecting the proper construction and maintenance of the highway, has done a noble work. The sidepaths for bicycles that have been constructed are a constant example before the people in many rural sections, and will awaken an ambition for better roads among those in authority. In one county one hundred and twenty-five miles of such paths have been constructed, many four and six feet wide, at an average cost of eighty dollars per mile. Every automobile that leaves its factory is a plea for better roads, and this plea will be brought more forcibly before the public as it moves along our highways. Every one is interested and will aid in the success of these vehicles. For this success good roads are necessary, and we believe that they will come.

### What An Automobile Must Possess.

In order to fill the requirements as a vehicle for the public an automobile must possess first a neat, trim appearance. It must be practically noiseless—neither to offend the ears of the user nor to cause uneasiness on the part of the beast it is to supplant. Its motive power should be such that neither clouds of steam nor disagreeable gases would accompany it. It should be provided with a signal appliance to indicate its approach, and at night a light to show its position. The motive power should be such as to require little attention while in operation, easily controlled and cheaply obtained. The automobile should be easily and positively guided, equipped with a brake independent of its motive power, should be capable of being operated forward or backward. The carriage seat must be so mounted that its occupant will be as comfortable as in an ordinary carriage. It should have a frame and wheels so constructed as to bear with a good surplus strength its motive machinery and load. It should be able to start itself with ease, and be as light in weight as safety will permit.

### Rights On Public Highways.

The automobile has the same kind of a fight before it that the bicycle and the electric railway have had for their rights on the public highways. While at Chicago and many other places the streets and parks have been opened after some opposition, yet in a number of cities self-propelled vehicles are still refused admission to the public drives and parks. It would be reasonable for these commissioners to oppose these vehicles during experimental trials, while undergoing tests or in time competitions, as depriving others of their rights, but to deny to owners of au-

tomobiles, whose carriages have proved their excellence and awakened the admiration of an interested public, is to assume an arrogance not considered fitting to officials in free America.

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**Automobile Clubs and Associations.**

Suggestions have already been made for the formation of an association of those interested in the automobile. There is no industry but has its national organization or equivalent. The necessity of such an association for this industry is apparent. At the present time, by means of concerted action, the rights of such vehicles might be protected and knowledge of the uses and advantages of the automobile might be more widely disseminated after having been considered by such an organization. Much expense would be saved to both manufacturers and users by the adoption of certain standards in the manufacture of the automobile. It is, of course, an early date to consider many of the things which would come before such an association. The columns of this paper are open for correspondents, or any suggestion on this subject.

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**Lights on Rubber-Tired Vehicles.**

A bill before the Connecticut legislature requires that all rubber-tired vehicles while in use on the public streets and highways shall show from one hour after sunset to one hour before sunrise a light visible from before and at the side of vehicle from a distance of two hundred feet. A fine of five dollars is the penalty for not complying with the law.

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**The Operating Expense of the Automobile**

With many of the recent inventions that have displaced older methods and appliances, cheapness has not always been urged on their introduction. Other advantages have won the day, and have often outbalanced an increased cost. For the automobile, reduced cost is generally claimed, whether it be an electric, gasoline or steam-propelled vehicle. Were it not for the fact that many of the vehicles are as yet untried, and the cost of maintenance, therefore, not as yet determined, the operating expense could be very closely estimated. The results that Messrs. Sever and Fliess obtained in the use of an electric automobile delivery wagon in connection with a New York department store, and the comparison of the cost of its operation with that of the horse and wagons in use, furnish interesting and substantial figures for such an automobile. In conclusion they say: "In light delivery service in large cities, when a number of units are employed by individual firms, the adoption of the automobile would seem to be merely a question of time. It is cheaper to operate than horse service, and the mechanical problems have been so far solved as to make the vehicles commercially successful. Though, as stated before, it is not the intention to discuss depreciation, it may be noted that the comparison of the cost of operation as regards food, cost of power, etc., would show a saving in favor of the electric delivery wagon, in one year, of twenty per cent., which, under more favorable conditions as to the price of power, might easily be increased." The average cost per day for two horses, one wagon, a man and boy was 428.54 cents, while for the electric automobile, under the same conditions, with a driver and boy, was 387.77 cents. The cost of current for a year was placed at $108.35, for 11,268 miles. This, as will be noticed, is a little less than one cent a mile. For gasoline and steam automobiles an even lower cost per mile for power is claimed by the manufacturers.

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**The Automobile in the Army.**

The fact that a peace commission has been in session discussing the disarmament question does not deter the aggressive military engineer from devising new war engines and adapting recent appliances to army use. Ever ready to take advantage of successful commercial devices the ingenious engineer has already seized on the automobile as an auxiliary to the army equipment. The automobile gun carriage is the latest thing, and the army mule must now look out for his job.

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**Safety in Control.**

The controlling devices of the automobile are probably as complex in their design as any part of the mechanism of the vehicle. This very complexity, however, produces for the operator simplicity and safety; simplicity in applying the power and controlling the speed and direction of the automobile, and safety against incorrect uses of the controlling devices. To put on the brakes while the power is full on would produce disastrous results, and this is one of several things guarded against.

On the electric vehicle the controlling lever is at the operator's right hand. It has four speed notches, ranging from three to thirty miles an hour, according to the different combinations of the battery cells, and of course the high-speed notches must be resorted to for hill climbing. The same lever is used for reversing, but to prevent a mistake on the part of the operator, he must first press down a button at the top of the handle before the lever can be thrown back. Again, if the driver puts on brakes before cutting off the current, the circuit is broken automatically, and can only be restored by returning the controller handle to the "stop" position. The steering lever is managed by the left hand, and is delicately adjusted. If the wheels fall into a rut, or meet with an obstruction such as paving block, there is no tendency to twist the lever out of the steersman's hand.

In the grip of the steering lever is set a push-button that operates an electric gong. Under the driver's foot is a powerful brake that works upon a band-wheel keyed on the rear axle. This is sufficient for ordinary use, and in an emergency a lever on the left throws in a shoe that brakes upon the tires, and is capable of stopping the carriage within its own length. Moving the steering lever to the right or left gives a corresponding change in the direction of the carriage. Pushing the controlling lever forward increases the speed, and one draws it back to slower speeds and to "stop" just as naturally as the horseman pulls in on the reins. Under the cushion of the seat is a lock-switch controlled by a key. The removal of this key disconnects the batteries, preventing any unpleasant results should strangers tamper with the carriage when left at the curb.

With the steam and gasoline automobiles equal precautions are provided. The difficulties which the automobile has to encounter seem to have been well understood by the designing engineer. The controlling devices are a most important part of the equipment.

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**On the Course.**

This story is told of M. de Knyff, the winner of the Tour de France automobile race. On the course, a quarter of an hour behind one and eight minutes behind another competitor, M. de Knyff was making his best pace when he caught sight of an insensible chauffeur lying in the road bleeding and generally battered to pieces. It was a cruel dilemma. To stop was to compromise his victory, to continue inhuman. Still, the sportsman, like the gendarme, knows no pity. Nothing would have been said to M. de Knyff had he continued his wild course onward. Besides, there were many competitors behind him who would be sure to pick up Williams, so he might have excused himself on this ground. De Knyff, however, stopped as soon as he saw his helpless rival, picked him up, carried him to the side of the road where he would be out of danger, and then went to fetch some water. A few minutes later a doctor came along. After examination, he found Williams' wounds were not so dangerous as they appeared at first. In the meantime the injured man recovered consciousness, opened his eyes and glanced up and saw de Knyff standing over him, tending him with touching solicitude. Then he, too, showed he was made of the right kind of stuff. for he said imperatively: "What! De Knyff, is that you? Get off at once! You are losing time!" or words to that effect. Evidently your true hero nowadays is the chauffeur

## Fisher Automobile Truck.

One of the first automobile trucks to make its appearance is illustrated in the accompanying engravings. The driving apparatus is constructed after the Patton idea. It is capable of carrying a load up to five tons at a speed of from four to eight miles per hour. In its present form it is crude in many features, which will be more carefully worked out in another truck which is soon to be built.

The design of the power equipment of this truck involves a three-motor idea, a gasoline engine with a connected dynamo for generating an electric current, a storage battery and an electric motor for driving the truck. This amount of machinery results in great weight to the truck which in this case amounts to more than four tons, of which amount the storage battery weighs about one thousand pounds. There are certain advantages in this combination which are evident to those who have studied the problem.

It is first independent of a power station. The storage battery provides energy for driving the truck four or five miles at any desired rate within the limits above mentioned. Thus the truck will have a reserve force should the generating part become deranged. The gasoline engine with its dynamo is supposed to keep the batteries charged, and thus to have on hand their full reserve strength. The dynamo, acting as a motor, can also be used to give the engine its initial start, and when running it can maintain a uniform speed irrespective of the motion of the truck.

The several objections to this type of truck are of course drawbacks to its use, but under the new design, which is said to be a great improvement over the one after which this is built, some of them will be greatly modified.

It will be hard to remove, however, the objections of large first cost, heavy weight and complexity of machinery. The advantages of a variable speed, a backward as well as a forward motion and the certain control of the truck are considered as sufficient offsets to these objections.

The engravings show only partially the mechanism of the truck. The cooling pipes are noticeable under the footboard and at the sides. A very large surface is thus provided in order that the water for cooling the cylinder may not reach the temperature of the boiling point. The designers have noted the liability of these tubes becoming damaged in this exposed position and will provide for a more protected place.

This truck has a wheelbase of ten feet, and wheelgage of sixty-six inches. The front wheel diameter is thirty-four inches and rear wheel diameter forty-six inches. The tires are four by five-eighths inches. The dynamo weighs about six hundred, the battery a thousand pounds, and other parts in proportion, giving a total weight of about eight thousand five hundred pounds. The entire iron work of the truck is heavily built, but even then some parts have been found too weak. It is a purely experimental truck, and it was expected that much would have to be changed, but at the same time some parts would be found good.

In the arrangement of the apparatus, the engine shaft lies lengthwise of the wagon, with the engine cylinders vertical. The dynamo is placed at the front end, and is shown in Figure 2. It is reported that the truck handles extremely well, being run through narrow alleys and turned on sharp turns and backed with equal facility. The steering arrangement is pronounced satisfactory and will be retained.

The next truck to be built shortly will be after a modified design of this truck. The engine is to be of a four-vertical-cylinder type, and of about twelve horse power. It is to be located under the driver's seat, with the shaft placed across the body of truck. The wheels are to be made heavier, with heavier and broader tires. The speed will also be lowered, and will range from three to six miles per hour. It is hoped to reduce the total weight of truck relative to its carrying load. The weight of driving machinery requires greater strength in the truck itself, and consequently greater weight. It seems that the whole problem lies in the driving equipment.

This truck can be seen at the "stables" of the Automobile Company of America, 213 West 58th street, New York City, where it is being equipped with their motors. It is well worth a visit to any one interested in a heavy truck.

FIG. 1.—FISHER AUTOMOBILE TRUCK.

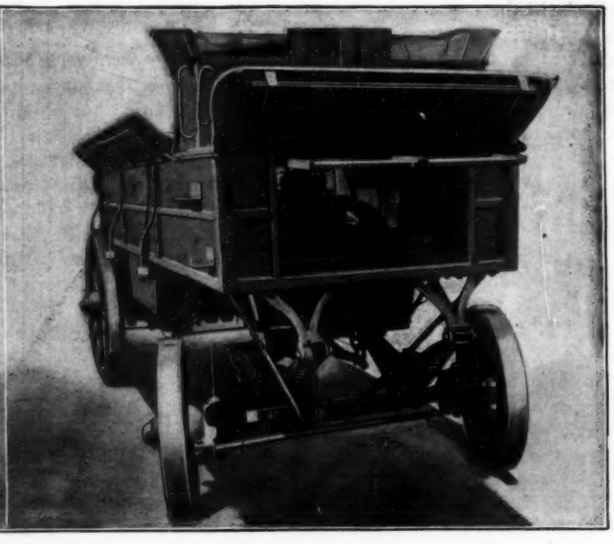


FIG. 2.—FISHER AUTOMOBILE TRUCK.

## A Message by Automobile.

A message from Brig.-Gen. Anderson, of Chicago, to Maj.-Gen. Merritt, of New York, is to be conveyed by an automobile, according to the plans of Messrs. Alexander Winton and C. B. Shanks, of Cleveland. They were to have started last month over the road previously taken by automobiles to New York, through Cleveland, Buffalo, Rochester, etc., but Mr. Winton was detained by a business engagement. They hope to make the record run this month.

Inquiries have been received at this office for automobile stages and tallyhos. Manufacturers can be put in communication with parties by addressing publishers.

# Automobiles for the Army.

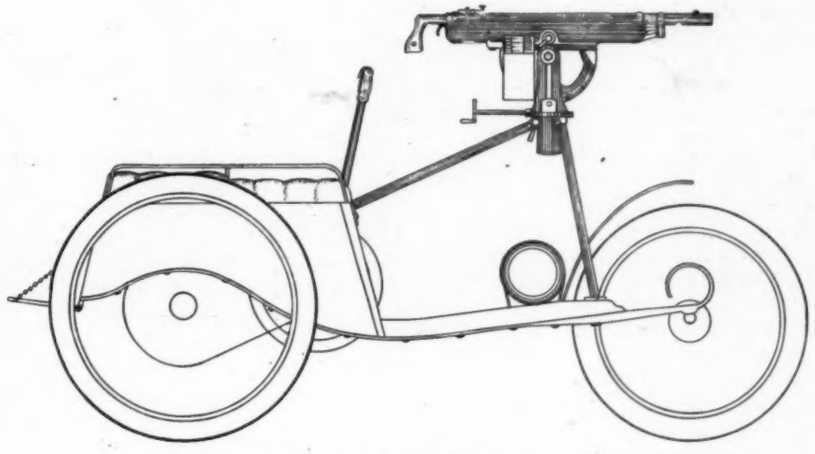
## Major Davidson's Automobile Gun Carriage.

A few years ago, as will be remembered, Major R. P. Davidson, of the Northwestern Military Academy, tested the bicycle for army dispatch service. At the head of a squad from the Academy bicycle corps, he made the trip from Chicago to Washington, D. C., and delivered to Secretary of War Alger the message from Major-General J. R. Brooke. The trip was made in army style, and the report rendered is very complete as to records of distances, disasters and successful runs, of rations and the physical condition of the riders.

One of the subjects that has since been receiving Major Davidson's attention is an automobile gun carriage. An outline of the carriage is given herewith. It is being built at the works of the Duryea Mfg. Co., Peoria, Ill., after the design furnished. Seats are provided for four persons, which constitutes a gun crew. There is provision for carrying twenty-five hundred rounds of ammunition, a few accessories and fuel. The large fuel tank for gasoline is placed under the forward floor, so as to be well protected from possible danger, and fuel for two hundred miles can be carried. This tank is of heavy seamless sheet iron, and is practically bullet proof.

The carriage employs the Duryea system of propulsion, which has been in use several years on carriages. It will mount a Colt automatic rapid-fire gun, firing about 500 shots per minute. The cartridges are seven millimetre U. M. C., with smokeless powder and nickel-jacketed bullets, and will have a velocity of two thousand feet per second. The range of the gun is about two thousand yards. The gun points forward, and is ready for use at any time; it is mounted on a swivel and can be swung around, up or down, to cover any object, its sweep being that of a full half circle.

The carriage will weigh about nine hundred pounds, of which quantity the gun accounts for eighty. The running gear is made very strong, to withstand the rough usage to which the carriage may be subjected. Its designer admits that its use in regular warfare is as yet an open question, but for street riots and similar uses believes it to be practical. A run to New York is contemplated the present month and possibly later, when a gun crew has been drilled in handling the gun, a run will be made to Washington and an exhibit made before army officials.



MAJOR DAVIDSON'S AUTOMOBILE GUN CARRIAGE.

## Automobiles for Artillery Service.

Although an inventor announces that he has a propelling device for driving the heavy carriage necessary for gun and ammunition, the board of ordnance is not yet ready to take up the subject of the automobile in the artillery service. It will await the further development of the automobile, especially as adapted for heavy loads and rough roads.

There are certain advantages possessed by the automobile for such service which lends encouragement to the belief that it will in the near future be utilized by the army. The difficulties most apparent are the heavy recoil the carriage must stand after the discharge of the gun, the rough country over which it must be driven, and the distance it will be required from machine shop or power station, if electricity be the power used.

It may be necessary with this as with many other appliances used in the army that private capital must first prove the fitness of the automobile for army use. By trials and test to show wherein the automobile possesses advantages over the present methods. It may never be possible to supplant entirely animal power, but as auxiliary to such power the automobile will unquestionably find a place.

## Sixty-six Years Ago.

In the volume of "New Monthly Magazine" for 1833 we find this paragraph: "The select committee appointed last session of Parliament, on the motion of Col. Torrens, conclude their report with the following summary of the result of their inquiries: First. That carriages can be propelled by steam on common roads, at an average rate of ten miles per hour. Second. That at this rate they have conveyed upwards of fourteen passengers. Third. That their weight, including engine, fuel, water and attendants, may be under three tons. Fourth. That they can ascend and decend hills of considerable inclination with facility and ease. Fifth. That they are perfectly safe for passengers. Sixth. That they are not (or need not be, if properly constructed) nuisances to the public. Seventh. That they will become a speedier and cheaper mode of conveyance than carriages drawn by horses. Eighth. That, as they admit of greater breadth of tire than other carriages, and that as the roads are not acted on so injuriously as by the feet of horses in common draught, such carriages will cause less wear of roads than coaches drawn by horses. Ninth. That rates of toll have been imposed on steam carriages which would prohibit their being used on several lines of road, were such charges permitted to remain unaltered."

## An Amphibious Automobile.

Every one that has read Jules Verne's story of the submarine boat, has been equally interested in the efforts of inventors to rival that wonderful boat of fiction. At the present time the trial of the Holland boat now being carried on at Little Peconic Bay, L. I., awakens new interest in this specie of craft. The Argonaut of Mr. Simon Lake might well be termed an amphibious automobile, since it will propel itself on its wheels over the bottom of the lake or ocean where the topography of the bottom will permit as well as through the water by means of its propeller. It is a land traveler as well as a water traveler. The propulsion of these boats is by means of gas engines and storage batteries.

The Holland boat carries power sufficient for a fifteen hundred mile cruise at a speed of six miles an hour. In its operation are utilized compressed air, a gasoline engine and electric storage battery. It is intended as an adjunct of the navy, while the Argonaut has the more peaceful mission of locating and recovering sunken cargos, but could be used for placing mines and torpedoes.

# The Automobile—Its Details, Management and Repair.

CONDUCTED BY GEORGE T. HANCHETT.

## Shunt Motors on Automobiles.

The use of shunt motors on street cars driven by storage batteries was early claimed as a great advantage, but most automobile motors are series wound. This cannot continue, for the advantages of shunt motors are too manifest. What better method of braking is there than to drop the controller off a notch or two and with the motors acting as dynamos turn the surplus energy back into the battery? The ammeter provided on most electrically-driven vehicles is a perfect guide in doing this. The instrument should be differential, and as the needle comes back to zero notch by notch may be turned off. In hill climbing, one-third and even more of the extra energy consumed can be recovered by coasting down the other side with the

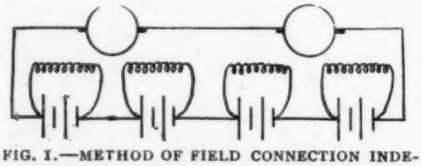


FIG. 1.—METHOD OF FIELD CONNECTION INDEPENDENT OF BATTERY COMMUTATION.

controller set a notch or two below the coasting speed. These well-known possibilities of shunt motors could not be fully attained on street cars, but with automobiles the problem is very easy.

Full field strength should be used at all times. The first act of the controller should be to make the field connections, and this condition need not interfere with the commutation of the cells. The field coils may be divided into as many sections as batteries, and each battery given a section. This arrangement will not interfere with the batteries being switched in any series or multiple combination that may be desired. Fig. 1 illustrates this. Two motors are shown in diagram, each of which has two field coils. The battery is divided into four sections, a very common arrangement, and each section excites a field coil.

## The Automobile Traction Coefficient.

This subject, which is one of the most important in the art, is practically a virgin field of investigation. No one seems to know the pounds per ton necessary to drag an automobile over asphalt, Belgian blocks, macadam, sand or dirt roads. No one has made the experiments with the various tires now on the market, or at least, if these experiments have been made, the data has been kept secret. Possession of this data answers the important questions, How much power is necessary to drive this vehicle? or how fast will a certain power drive it? There exists an opportunity for much glory and no thanks. To determine this data for public benefit is too altruistic for a modern individual, but affords an ideal duty for a club committee. Clubs for the general advancement of automobilism are now forming. They should take up this important matter in the heat of their ardor, for it is not an easy task, though amply justified by results.

## Where is the Power Consumed?

If we block an automobile clear of the ground (an electrically-driven one with a good ammeter is best for experiment), we shall find that the power required to turn the wheels at a given speed is the merest fraction of the power required to drive the vehicle at the same speed on the road. Theory states, and rightly so, that no work is done in moving a vehicle from a certain place around any closed loop returning to the same place. But theory rides in a frictionless automobile that offers no resistance to the air and which can recover on the coast of a grade all the energy used in climbing, and similarly regains possession of all the starting energy by restoring it to its batteries on stopping. We of the commonplace world, who are striving for this ideal, should be interested to search diligently for the ampere hours which our crude constructions demand shall be periodically replenished. Thus we are confronted with our problem again, which in the concrete may be stated: If my vehicle blocked up requires one-quarter of a horse power to drive it at twelve miles an hour, and uses two horse power to drive it at the same speed on the level road, where is the added power used? What has been added to the vehicle? The answer is easy; pressure on the bearings and gears, air friction, and tire contact. It can be experimentally demonstrated that pressure on the bearings and gears cannot be largely responsible, and air friction, except in the case of high winds or high speeds, is slight. Tire contact remains as the delinquent, and because of this we must be very careful in the selection of tires. We have encountered this problem before. Most of us know that a hard bicycle tire is "faster" than a soft one. It costs power to knead pneumatic tires. We need as hard tires as our comfort will permit us to use.

## Electric Brakes.

The electric brake, using power from the storage battery, is the most wasteful of all brakes, for it uses energy to destroy energy, but it cannot be denied that it is prompt, powerful, reliable and convenient. As long as the public will use and pay for it, it will be made and sold, and in this connection the accompanying sketch may be of interest, Fig. 2. It is a dimensioned drawing of an iron-clad solenoid, adapted to use at full power about twenty-five watts. The pull necessary to detach the armature considerably exceeds fifty pounds, and, moreover, these figures are typical of other sizes.

The pull is of exactly the character required on a brake, gentle at first, taking up the slack of the mechanism, and powerful

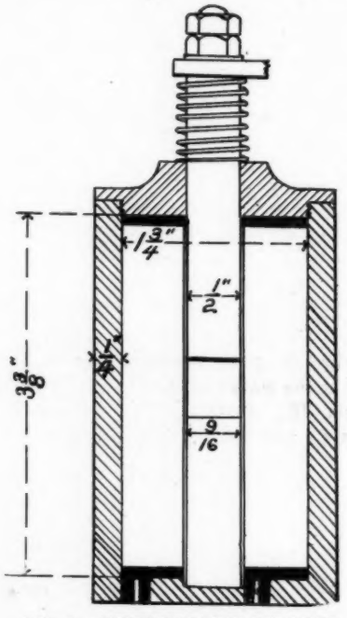



FIG. 2.—ELECTRIC BRAKE CYLINDER.

after the back lash has disappeared. Moreover, it can be added to any existing brake mechanism without interfering with the hand or foot brake, which then becomes a reserve. The device should prove attractive in the hands of a good designer.

## Weight and Cost of Electric Vehicles.

In most electric vehicles it will be found that the storage battery represents very closely one-half the weight of the vehicle. Investigation will develop that the estimate is as close as one hundred and fifty pounds for the average weight of a man, or one thousand pounds for the weight of a horse, and a little thought will show that this consideration is very pertinent. It resolves itself into this. For every pound of equipment installed on the electric vehicle a pound of storage battery must be added to carry it around. Therefore, especially do automobiles need light motors, controllers, bodies and trappings. Every saving and likewise every extravagance is twofold.

Herein appears a reason for the cost of automobile motors and designs. They are new, and new things are expensive. No one has heretofore attacked the problem of building a small light motor of large output. Weight has not been a consideration, and now that engineering talent has been concentrated on the production of lighter motors they will be found expensive until the field widens and competition becomes keen. This commercial fact is true of all

automobile work. The present day is analogous to that of the $150 bicycle. Ten years hence we will be getting better machines for less money. Automobiles now cost almost $1.00 per pound. A first-class locomotive can now be bought for ten cents a pound and will pull more, travel faster and last longer.

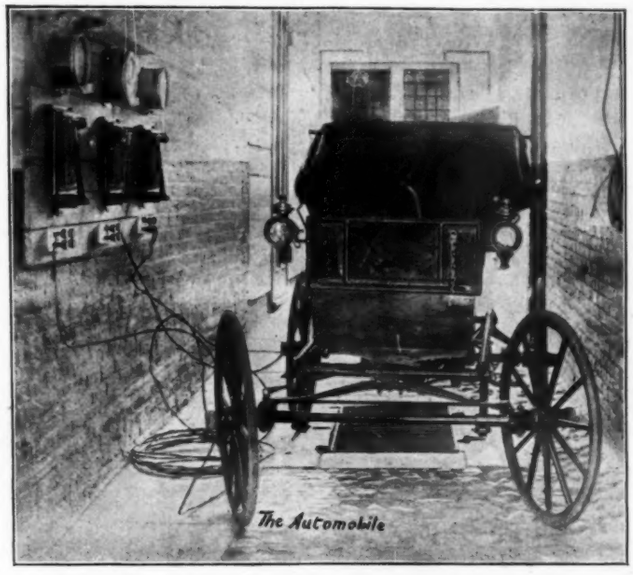
### The Horse Power vs. the Horse.

The comparison of these prime movers, however absurd in the eyes of the professional man, will always be made by the non-technical man, and the case of the automobile affords peculiar provocation for such a comparison, which oftentimes leaves the comparator sorely puzzled. A delivery wagon which one horse can handle uses a two horse-power motor. It runs faster and further, and yet when it gets stuck in mud hole or on a grade two horses can easily pull it out. The seeker after knowledge is informed that the average horse would very soon tire of exerting one horse power.

The fact of the matter is that the motor or engine will develop one horse power at its full speed while a horse will develop his power at any speed, and, moreover, in the traction grip on the ground the horse has a decided advantage. If we had a motor with a system of gearing from one revolution per minute up to full speed, thereby enabling it to exert its full power at all of these speeds we would have a machine comparable with the horse. If we could, when we reached a steep grade, change the gearing from 20 to 1 to 100 to 1 we would mount the grade as easily and as rapidly as the horse. There is a chance here to learn a useful lesson in automobilism. Heretofore extra power equipment has been provided for these contingencies, and this extra power is developed only on grades. The motors for the most part operate at a fraction of their full power, and hence at low efficiency. Some system of back gearing is the natural suggestion, and an arrangement rapidly changeable at full speed offers opportunity for the inventor.

### Charged and Stabled.

What to do with, and how to care for, are questions that first confront the automobile owner. The central station is not always equipped for charging and the demand at the present time has been so limited that few stations have made the necessary preparations. Unless connections can be made at the curb or the carriage run inside the station, charging is impossible, as the unprotected wires would not be permitted on the sidewalk. We shall probably soon see charging stations provided at every hotel. Until such time it is important to know where you can have your carriage stabled and charged, whether it be the batteries of the electric automobile or those used for ignition in the gasoline automobile. The accompanying cut shows an automobile having its batteries charged at the shops of The Storage Battery Supply Co., 239 E. 27th street, New York City. Carriages are received, stabled, batteries charged, and are ready for the user in the morning or charged during the day. When it is desired, the batteries are removed from the vehicle, placed on a small truck and taken to the charging-room.




CHARGED AND STABLED.

### A Comparison of Motive Powers.

By A. Fisher.

Commercially, we need at present to consider but three systems of mechanical propulsion of road carriages—the electric, the steam and the gasoline engine. We read a great deal in the papers concerning the compressed air, carbonic acid-gas and liquid-air motors, but as yet nothing has been demonstrated in regard to them, except the ability of the promoters. The electric system is now being pushed by ample capital, has been extensively tried in this country, and we shall soon see whether it is destined to meet with success or failure, in the limited field in which it can be applied.

The steam carriage is now also being rapidly brought to the front. Aside from any questions of merit in this system, the laws of most states do not allow steam carriages on the streets of cities. The gasoline carriage has not as yet been pushed to the extent the system deserves, although it is the system that has made the automobile a success. In France the gasoline automobiles outnumber all others about 100 to 1. They are the only ones that have so far been successfully used for touring. It is the opinion of the writer that this will soon be so in this country. Below is given a synopsis of good and weak points of these systems.

A short synopsis of the advantages and disadvantages of each system:

ELECTRIC STORAGE BATTERY SYSTEM.

| Advantages. | Disadvantages. |
|---|---|
| A rotary motor. | Its limited range of action being about 20 to 40 miles radius from source of supply, hence can only be used in large towns with a number of central supply stations. |
| Absolutely no vibration. | |
| Transmission of power from motor axle simple. | |
| Ease of manipulation. | |
| Can be handled by almost any one with a little practice. | Excessive weight of batteries, being out of proportion to load carried. |
| No heat. | |
| No odor. | Lack of economy, being the most expensive of all systems. |
| Motor can run in either direction at almost any speed from 0 to 1000. | Short life of batteries. |
| Driver can start carriage without any preparations. | Cost per mile on pleasure carriage about 5 cents. |

STEAM.

| Advantages. | Disadvantages. |
|---|---|
| Little vibration. | Dangerous on account of the pressure in boiler. |
| Transmission of power simple. | Dangerous on account of use of liquid fuel used to heat boiler. |
| Weight moderate. | Boiler easily ruined by impure water. |
| No central station required for charging. | Difficulty of management, requiring an engineer. |
| | Discharge of steam on starting (frightening horses). |
| | Length of time required to start—getting up air pressure, lighting torch to heat burners in getting up steam pressure. |
| | Difficulty of keeping up enough steam pressure to supply engine. |
| | Odors from imperfect combustion of oil. |
| | Cost of operation about 3 cents a mile. |

GASOLINE.

| Advantages. | Disadvantages. |
|---|---|
| Absolute safety. | Some vibration. |
| No fire for engines. | Motors must be started by hand. |
| Moderate weight in proportion to load carried. | |
| Economy of fuel, about one-quarter as much oil being consumed for horse power as in steam. | |
| The only system having an unlimited range of action. Gasoline and water can be carried sufficient for 300 to 500 miles' run. Can be used anywhere. | |
| No especial knowledge required for management. | |
| Cost of operation about one-half cent per mile. | |

## Here and There.

Henry House, of East Bridgeport, Conn., has recently completed an experimental automobile operated by steam.

For use by the army, an automobile has recently been designed intended to carry a Maxim gun. This is the invention of an Englishman, Frederick Sims.

In an automobile race, according to a press dispatch, between Paris and St. Malo, M. Anthony made the distance of two hundred and thirty miles in seven hours and thirty minutes.

Less and Less.—Right on the heels of the horseless carriage, wireless telegraphy and the chainless wheel comes the berryless strawberry short cake at the suburban hotel, where the hungry wheelman stops for "refreshments."—The Wheel.

Spain is not behind in the ranks of the automobile countries. A line of automobile coaches is reported to have been put in operation between the towns of Rosas and Figueras, a distance of twelve miles. These coaches will accommodate nine passengers.

A fireman's cart of the electric automobile type has been put in service in the city of Paris. It will accommodate several firemen, and between and below the seats is the hose reel, with the batteries below and ladders at the side of the cart. It is said to be neat in appearance.

The Frenchman evidently knew what he was talking about who, in speaking of Davis' proposed transcontinental trip, said: In planning a trip here we look out for a place for a good dinner. In the United States you seem to have to look out for a place where you can get your automobile repaired.

A record has been established between Broadway Ferry and Coney Island and return of ninety minutes by Mr. Whitney Lyon. The distance is about thirty-five miles, and was made on one charge of the batteries. The automobile trap carried four persons on the trip, and all seemed to enjoy the ride.

Automobiles run at high speeds are not to be permitted in New York even for a five-dollar fare. This was fully explained to a cab driver at the police station the other day after he had made a wild chase down Fifth Avenue. He was given an opportunity to consider the matter in a cell until someone appeared to bail him out.

Among the recent patent applications is one for what might be called an electric pusher. The idea is that this propelling device, mounted on two driving wheels, may be attached to the rear axle of any vehicle, the thills removed, a steering crank introduced, and you have an automobile, after the carriage before the horse plan.

A wedding trip on an automobile was planned by Campbell Crittenden and his bride, and the trip from Columbus to Cleveland was accomplished under very trying conditions. Heavy rains deprived the roads of the bridges and made the roads almost impassible, so that when Cleveland was reached they were glad to take the train.

Mr. J. C. McCoy, of Perth Amboy, N. J., recently received a new automobile carriage from the Winton factory at Cleveland. The wheels are fitted with "Diamond" pneumatic tires. The power is furnished by a gasoline motor and is transmitted to the axle by two sets of gears to give a variable speed up to twenty miles an hour.

The residents of the Petit St. Bernard Pass were astonished at the appearance of an automobile on July 26. This pass is at an altitude of more than seven thousand feet, and it is believed that this is the first of its kind to reach this altitude. M. Xantho, the owner, was on his return from a trip through northern Italy. The automobile is of the Panhard-Levassor type.

An automobile at Hartford showed its capabilities in the way of making a wreck of itself the other day. In crossing a street car track a rear tire caught, and a wheel was torn off. This in some way caused the vehicle to be overturned, and the batteries and contents were thrown in every direction. The weight of motor and running gears demolished the carriage body.

A competitive test of the speed of automobiles took place Saturday, July 28th, between Porte Maillot to Poissy and return, about thirty-one miles. The best time was one hour and twenty minutes. An accident to one carriage deprived it of a wheel. This race was organized by the Paris paper, "Sport Universel Illustre," and then entries were classified according to weight of vehicles.

An automobile race took place at the Belmont Driving Park, Philadelphia, on Friday, July 28th. There were three contestants, handled respectively by Jules Junker, Thomas R. Langton and W. H. Roach. Mr. Jules Junker pulled in the winner in seven minutes, thirty eight seconds over the two-mile course, leading by about ten feet. The race was witnessed by nearly three thousand people.

Another innovation which Paris will soon make is an automobile combining a street sweeper and sprinkler. The arrangement is such that the sweepers can be raised out of contact with the pavement when it is desired to use the sprinkler. The batteries are carried in the front, where is also mounted the motor. The motive power here balances the sweeping and sprinkling apparatus in the rear. The first of these is to be ready in the fall.

For a vacation outing the automobile is superb, according to Raymond H. Bettys and his friends, of Rochester, N. Y., who recently returned from a three weeks' trip among the hills and dales of Seneca county. During their trip they traveled nearly five hundred miles. The only accident of any kind was a slight puncture of one of the tires, which was quickly repaired. The automobile was driven by a gasoline motor, for which supplies were easily secured along the route.

A few days since postmaster Dorr, of Buffalo, made a test of an automobile for the collection of mail from letter boxes. Forty boxes on a route eighteen miles long were called at and mail collected in one hour and thirty minutes. A horse and wagon making the same trip required three hours and a half. The automobile used was a trap, and not, of course, the best fitted for such service. From this test and others subsequently made Mr. Dorr has made a report to the post-office officials.

Probably the recent race of automobiles in France, known as the Tour de France race, was the most successful of the kind that has so far taken place. The race was commenced July 16, at 8 a. m., with forty-seven competitors. The route was divided into thirty stages, with a total length of fourteen hundred and twenty-eight miles. The winner, M. Rene de Knyff, completed the trip July 25, about six minutes in advance of his nearest competitor. The total time was forty-four hours and forty-four minutes.

"America is the home of the shockingly bad road, hence it is not surprising that this country has been slow to become affected with the germs of automobilism. In France, where urchins play billiards on any country road, automobilism has reached the height of a national craze. High speed races are held, automobile clubs take the place of the absinthe drinking and idling organizations, and the person who drives a horse is regarded in the light of a lunatic who clings to the delusions of the Dark Ages," according to the Denver Republican.

A new record has been made for the electric automobile in France. Comte Chasseloup Laubot rode from Paris to Rouen, a distance of eighty-five miles, on one charge of his batteries. As electric vehicles are equipped with batteries in this country their limit is from thirty to forty miles, which has been given as one of the disadvantages of the electric automobile. Should their capacity be doubled they would then be in condition to travel from one power station to another in towns through the country in the eastern part of the United States.

## From Our Contemporaries.

Number of Automobiles in Use.—It would appear from data now in our possession that in Europe there are now well over 7,000 owners of automobiles. Many of these own more than one vehicle, so that perhaps the number of vehicles could be put at 10,000. Of the 7,000, no fewer than 5,600 are in France. The general idea has been that in France the interest was centered in Paris, but this is erroneous, there being of the 5,600 no fewer than 4,541 scattered all through the departments. In France, moreover, there are 619 manufacturers of automobiles, not including makers of detail parts, 998 of them, 1,095 repair shops, 3,939 stores for oil, gas, etc., and 265 electric charging plants and "posts." For the remainder of Europe the figures are far from complete, but it would appear that there are 268 owners of automobiles in Germany, 90 in Austro-Hungary, 90 in Belgium, 44 in Spain, 304 in Great Britain, 111 in Italy, 68 in Holland, 114 in Switzerland, and 35 in Russia, Denmark, Portugal, etc.

No such figures as these are obtainable for the United States, and if we put the number of automobiles in this country at 500 it will probably be an exaggeration. The number of makers actually at work or organizing is somewhere around 100. Fortunately for our credit as an inventive and enterprising nation, there is every promise of a great outburst of activity, and, as we noted not long ago, one concern has laid out plans and contracts for some 4,000 electric vehicles to be built and delivered as quickly as facilities will allow. Other concerns, electric, oil, etc., are now about ready to build each from three to five vehicles a day, so that even within a single year this country may overhaul Europe. Many of our automobiles are going abroad, but several are being brought here, and without doubt the rapid advance of the art will depend in no small measure upon this international exchange of inventions, methods, devices and improvements.—Elec. World and Engineer.

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No Flies on Automobiles.—The caption of this editorial article looks rather slangy, but it is indeed only the plain matter-of-fact expression of the views of a government entomologist who has been studying the automobile situation. According to this authority, with the automobile there will be less opportunity than ever for the fly to exist and propagate. The horsefly in particular will have to go. It is intimated that while this fly is not exactly a parasite of the horse, it has no raison d'etre unless the horse is around, and that with the disappearance of all the unsanitary conditions due to the horse, the fly must perish off the face of the earth. We are not aware that the authority cited has any prejudice against the horse, but when it has been pointed out in these columns how much the horse does to spoil the streets, to crowd out human beings with its stables, to create dust and disease, and in general to render life less pleasant for man in the city, it has been urged that we are discreditably holding a special brief for the automobile. That is a narrow view to take. No one asserts now that the engineering and mechanical papers have a grudge against the horse or the ox or the mule because they preach the excellencies of the locomotive, the steamship, the gas engine and the power press. To recognize the fact that the horse in cities is an anomaly and an anachronism may not after all be a sin. Neither is it a special virtue. It is common sense.—Elec. World.

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Not so dangerous.—Although the electric vehicle has scarcely been introduced into public use, its dangers are already subjects of discussion in the daily newspapers. Incompetent and reckless operators have given ground for public alarm and failure of the controlling devices to work properly has increased the distrust which many had felt toward the innovation. It will not allay public fears to point to the number of accidents that are due to runaway horses. The street railway men of the country will appreciate this fact and they will recall the opposition to the "deadly" trolley that was developed in this country only a few years ago. It is true that public sentiment has changed, but many enterprises suffered in the meantime. When a little attention will avert trouble it seems that the promoters of automobile companies would do well to avoid the dangers that the trolley men encountered. This is the critical time, and by exercising care and intelligence the promoters of these new enterprises will save themselves lots of trouble in the future.—West. Elec.

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Licensing Automobile Drivers.—The Mayor has taken a commendable step in directing the Corporation Counsel to draw up an ordinance providing for the examining and licensing of all persons who intend to drive automobile vehicles through the streets and parks. The precaution is of the same kind as that which requires the engineer of the smallest steam yacht to give proof of his skill before being allowed to run on navigable streams. Paris has found it desirable to have an automobile ordinance of this kind, and there can be no doubt that when the new vehicles become more numerous in Chicago they will need regulating, both as to speed and as to the skill of their drivers.

It may justly be claimed that an incompetent driver of horses may cause as much damage as one on an automobile, but as men have been driving horses for several thousand years it is fair to presume that the green hands in the business are fewer than those in the art of steering a motor carriage. If we are about to change to a new mode of locomotion this is a good time to begin demanding a certain amount of skill and knowledge on the part of the man at the lever. The fee for examination should be nominal and the board of examiners should be made up of electricians and experts in such machinery. There is no reason why the license feature should be any more of a hardship than it is for cab drivers. It is certainly desirable for the general public that none but competent men be allowed to manipulate the new vehicles, especially for the next few years, while the Chicago horse is becoming reconciled to the new order of things.

In providing for the limit of speed allowed to automobiles there is no reason why the law should be any more severe than that now used to prevent fast driving with horses. Reckless speed—with horses, bicycles, and automobiles alike—is chiefly a matter of place and time. A speed that is perfectly safe on an empty street might deserve arrest in a crowded park. An arbitrary limit of some kind must be set, but its enforcement, as in the case of bicycles, will have to be left largely to the discretion of police officers. The licensing of the drivers will be a far more effective check upon reckless speed, for one or two offenses of this sort can be made the occasion of taking away a driver's license. The ordinance now in force in Paris should be a useful model for the proposed measure in Chicago.—The Tribune, Chicago.

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Rapid Growth of Industry.—The performances of which the various gasoline and steam vehicles are capable need to be demonstrated repeatedly and the results should be given the widest possible publicity. When speed contests and long road contests shall have followed close upon one another for a half year, and the results shall have been carefully noted in the press of the whole country, capitalists will fall over each other for a chance to enlarge the manufacture of any vehicle which has acquitted itself creditably. It will be apparent to them, then, that the demand will be sufficiently active to pay high interest on their money until the time may come when competition between the various makers shall really begin to be felt as a check and a warning. And they will understand that when that time shall come the general demand for motor vehicles will have grown so large that the particular establishment in which they may have invested their money will have lost none of its value, even if its products shall then have ceased to rank among the best.

Any plant equipped to produce gasoline or steam vehicles will increase in value

year after year for at least twenty years to come, for the simple reason that it may at any time be made available with very few changes for the production of that type of vehicle which at any given time is recognized as the best. In other words, it may at almost any time be sold to a more successful competitor that requires increased capacity.—Cycle Age.

In crowded streets.—After a visit of several months in various European capitals, Mr. M. K. Eyre, upon his return, said that the congestion of travel in the principal thoroughfares was greater than that encountered in American cities, and was constantly growing. On the Strand and other streets in London blockades lasting twenty minutes are of frequent occurrence. The electromobile, being shorter than the horse and vehicle now in use, and considerably more manageable, would greatly diminish the tendency to blocking, and free the streets of the unnecessary and undesirable occupancy of the horse.—Elec. Review.

## The Passing of the Horse.

By D. L. May.

Mechanical traction in every form and for every purpose is the enemy of the horse which has been to man from prehistoric time the most useful of the domestic animals. We will see the horse displaced by the automobile, as a driver, for draft purposes and as a means of transfer just as electric traction displaced the horse on our street railways.

Ten years ago, with the exception of two or three new electric lines which had been built by the more confident capitalists, the street railways of the United States were horse lines. As these roads showed the advantages of electricity as a motive power, and proved the excellence of mechanical traction over the filth producing horse, the roads were generally changed to electric roads. At the present time there are few horse roads, and such as exist are either in the out-of-the-way places or on short cross lines.

The automobile promises to curtail the field of the electric railway for light country travel between places where the amount of travel would not warrant the expense of the installation of an electric railway. For lines where the travel is only during one season of the year, a line of automobile omnibuses will meet the requirements of such service in many cases. The automobile and the electric railway will relegate to rural sections the horse, whose noble service will not be forgotten, but whose usefulness has been curtailed by modern invention.

## An Historical Automobile.

The accompanying illustration is from "The Mechanics' Magazine" for January, 1834, and is thus described in the accompanying text: "The carriage represented in the drawing is built to carry fifty passengers. The wheels are about six inches broad in the tires and eight feet in diameter. The crank-shaft worked by the cylinders is connected by endless chains with the axles of the hind wheels of the carriage, and each wheel has a separate axle. The spokes of the wheels are so constructed as to operate like springs to the whole machine—that is, to give and take according to the inequalities of the road. The boiler consists of a series of double tubes,

AN HISTORICAL AUTOMOBILE.

one within the other, placed in a vertical position around a circular fireplace and communicating with it; the heated air passes through these tubes, which are everywhere surrounded with water. The tubes are in the form of siphons, to counteract the effect of unequal expansion. The draught is produced by a fanner worked by the engine, and the furnace is made to consume its own smoke. Birmingham, Oct. 3, 1833."

## Lots o' Thae Things Some Day.

The following incident related in a recent number of the Motor Car Journal, London, affords an excellent example for drivers of horses when meeting automobiles. "While motoring through Crossford recently I was much struck with the plucky behavior of a silver-haired old dame, who could not have seen less than seventy summers. She was driving a little market cart, to which was harnessed a fairly fiery-looking young pony. We slowed down on approaching, but the pony turned completely round and looked as though he meditated a "bolt." The old lady pulled it up sharply, and gave it a smart cut with the whip to show she would stand no nonsense. One of our party by this time had run to the pony's head and helped to bring it round. The plucky driver set it going again, and we thought it had got over its nervousness, but on approaching our by this time perfectly "dead" motor (we had stopped the engine) it again wheeled sharply round, nearly upsetting the light vehicle it was pulling. The old dame's spirit was up by this time, and with a "Na, na, I'm no goun to be beat with the powny, he'll have to pass lots o' thae things some day," she argued out the point with her stubborn steed till in the end she conquered, and made him walk closely past the monster who had inspired him with so much alarm. It is pleasant to record an instance of this sort, for as a general rule a meeting of this kind is usually attended with a more or less voluble flow of lurid and picturesque language."

## Patents.

628,492. SECONDARY BATTERY. C. Risdale, Chicago, Ill. Filed May 28, 1897.

Claim.—The plate comprises in its construction a sheet of oxide of lead formed in a complete integral mass having extensions in the form of ridges along its side and corresponding recesses between the ridges; a strip of conducting material extends centrally through the plate.

628,661. SECONDARY BATTERY ELECTRODE. J. C. Howell, London, Eng. Ap. filed July 8, 1898.

Claim.—The electrode consists of a metallic ribbon in the form of a helix, with each turn in the form of a cone and partially covering the next preceding turn, the object being to increase the surface.

628,476. JUNCTION OF CYCLE, MOTOR-CAR, OR OTHER FRAMES, &c. Joseph H. Kirk and John W. Jeffs, Birmingham, England. Filed Mar. 18, 1898. Serial No. 674,275.

Claim.—In a junction for the tubes of cycles and like frames, the combination of the tube ends fitting one within the other, the main blocks having oppositely-inclined faces, the supplemental blocks having correspondingly-inclined faces resting upon the inclined faces of the main blocks and adapted to be forced outward by the separation of said main blocks, the wedge members located between the main blocks, and the screw-bolt for operating said wedge members, substantially as described.

628,791. HUB FOR WHEELS OF VELOCIPEDES, &c. Eugene Germaine, Paris, France. Filed Apr. 16, 1897. Serial No. 632,443.

Claim.—In an adjustable bearing, the combination with a spindle, of an adjusting bearing member screw-threaded thereon and provided with an engaging portion, a locking device longitudinally movable with relation to said spindle and having an engaging portion to co-operate with that of the bearing member, a spring to maintain said locking device normally in engagement with said adjusting member, and means for preventing relative rotation of said spindle and locking member.

628,957. ELECTRICALLY-DRIVEN VEHICLE. H. Van Horenbergh, New York, N. Y. Ap. filed June 2, 1897.

Claim.—For a foot lever which in operation first slows down motor, and then cuts it out and thereafter applies friction brake.

631,191. STORAGE BATTERY CELL. Axel K. Westerdahl, New York. Filed June 24, 1898.

Claim.—A cover for a battery cell having a soft marginal portion through which the lugs protrude and having a central opening. A glass or porcelain section of a slightly greater area than the central opening is forced into grooves so as to expand the marginal portion and effecting a secure engagement with the walls of cell.

628,514. ELECTRIC VEHICLE. William F. Zimmermann, East Orange, N. J. Filed May 12, 1899. Serial No. 716,500.

Claim.—The combination of a vehicle, of a detachable electric propelling device comprising an electric motor, a source of current and a single axle and its traction-wheels carrying the same.

626,020. MECHANISM FOR STARTING, STOPPING AND REVERSING DIRECTION OF MOTION OF ELECTRIC MOTORS AND F_R CONTROLLING SPEED OF SAME. J. H. Foster, New York. Filed July 8, 1898.

Claim.—An invention that provides, first, for means whereby the several switches by which the circuits are closed or opened are operated in unison to cause the delivery of the current to their respective motors in the proper direction; second, for means whereby the reversing switches are made to reverse the currents to their respective motors and the direction in which the said switches are moved indicated to the motorman; third, for means whereby the movements of the current controllers are arrested at one point in their rotation and then moved rapidly forward over another portion thereof.

627,823. ELASTIC TIRE FOR VEHICLES. Frank W. Kinney, Chicago, Ill., assignor to the Calumet Rubber Tire Company, same place. Filed Jan. 16, 1899. Serial No. 702,249.

Claim.—A tire for vehicles comprising an annular channel B, an annular elastic body A compressed in the direction of its length and molded with a continuous closed chamber throughout its length, and a retaining-ring embedded within and filling said chamber and having its ends joined together, said ring consisting of a central web d' having solid thickened edges d, said thickened edges extending both above and below the plane of said web and thus forming channels on both sides of the ring to receive the compressed rubber of the body, and hold the ring against lateral displacement.

627,972. MEANS FOR RESTORING AIR-PRESSURE IN PNEUMATIC TIRES. John F. Brady, Chicago, Ill. Filed Nov. 17, 1898. Serial No. 696,694.

Claim.—In a tire for vehicle-wheels having a pneumatic cushion-chamber, a second chamber within the cushion-chamber, and an air-supply within the second chamber at a higher pressure than in the cushion-chamber, and a passage-way for air connecting the two chambers with a valve adapted to admit air from the second chamber into the cushion-chamber, by pressure thereon transmitted through the wall of the cushion-chamber, for the purpose stated.

## Notes From the Trade.

Among the American automobile manufacturers that exhibited at the recent second annual exposition of automobiles at Paris, were the Columbia Company, the Riker Company and the Cleveland Machine Screw Co.

Chicago is soon to have an electric automobile cab service, together with light runabouts and carriages. Mr. W. L. Githens, who is superintendent of the Illinois El. Vehicle Trans. Co., promises to have a few cabs in service immediately.

The Graham Equipment Company have now a number of their steam carriages, suitable for two or four passengers, ready for immediate delivery. The price is $1,800, and the vehicle weighs eight hundred pounds. It carries sixty miles of water and one hundred and ten miles of fuel.

Among recent purchases of automobiles is an order from B. Altman & Co., of New York, for twelve delivery wagons, to the Automobile Company of America. These wagons will be propelled by gasoline motors. The first wagon is to be delivered this month, and the others as fast as they can be turned out.

The Riker Electric Vehicle Co. has purchased the business of the Riker Electric Motor Co., of Brooklyn, N. Y., and has transferred the entire plant to Elizabethport, N. J. This company is now manufacturing automobiles and electrical apparatus.



### A Necessary Request.

"Now, look here, Maria; the next time we go buggy ridin', and you feel like wishin' you had a horseless carriage, you please do your wishin' so the horse can't hear you. He's altogether too accommodatin'."—Harper's Weekly.

## Directory of Automobile Manufacturers.

(When addressing please mention THE AUTOMOBILE.)

American Electric Vehicle Co., Chicago.
American Motor Company, New York.
Automobile Company of America, New York.
Buffalo Spring & Gear Co., Buffalo, N. Y.
Cleveland Machine Screw Co., Cleveland, O.
Columbia Automobile Co., Hartford, Conn.
Crouch Automobile Mfg. & Trans. Co., Baltimore, Md.
Duryea Mfg. Co., Peoria, Ill.
Eastman Automobile Co., Cleveland, O.
Excelsior Machine Co., Buffalo, N. Y.
Finley Rubber Co., Atlanta, Ga.
Franco-American Vehicle Co., New York.
Grout Bros., Orange, Mass.
Graham Equipment Co., Boston, Mass.
General Electric Automobile Co., Philadelphia.
General Equipment Co., Camden, N. J.
Horseless Vehicle Co., New York.
Haynes-Apperson Co., Kokomo, Ind.
Lewis Motor Vehicle Co., Philadelphia.
Locomobile Co. of America, New York.
Mobile Company of America, Tarrytown, N. Y.
Meeker Mfg. Co., Dayton, Ohio.
National Bicycle & Motor Co., Bridgeport, Conn.
Overman Wheel Co., Chicopee Falls, Mass.
Oakman Motor Vehicle Co., Greenfield, Mass.
Pittsburg Motor Vehicle Co., Pittsburg, Pa.
Riker Electric Vehicle Co., Elizabethport, N. J.
St. Louis Motor Carriage Co., St. Louis, Mo.
Strathmore Automobile Co., Boston.
Stearns, E. C., & Co., Syracuse, N. Y.
Winton Motor Carriage Co., Cleveland, O.
Woods Motor Vehicle Co., Chicago.



### From Many on File.

Baltimore, Md., Aug. 1, 1899.

The E. L. Powers Co.,
150 Nassau St., New York.

Dear Sirs: Replying to yours of the 27th ult., we are delighted to know of your paper devoted to the interest of the automobile, and sincerely wish you much success. You can place us upon your subscription list.

Yours truly, ——— ———

New York, Aug. 9, 1899.

The E. L. Powers Co.,
150 Nassau St., New York.

Dear Sirs: Yours of the 8th has been received and also a copy of the first number of "The Automobile." I have been much interested in looking over the paper. There seems to be an excellent field for such a publication, and it is hardly necessary for me to say that I wish you every success in this enterprise.

Yours truly, ——— ———

Mr. E. L. Powers, July 31st, 1899.
150 Nassau St., City.

Dear Sir: We note with pleasure that you are about to publish an illustrated monthly journal which you will call "The Automobile." We wish you every possible success with your enterprise, and feel sure that the international interest in this line of industry fully justifies good literary effort. The undersigned has been to Europe this summer in the interests of the automobile business, examining the latest productions of Germany, France and England, and feels confident that within a comparatively short period the United States will be in the lead, not only in design and simplicity, but also in the quantity of automobiles produced.

Our company has been developing this line of industry for the last five years or more, which entitles us to rank among the first pioneers in the business. We are giving the preference to the gasoline or hydro-carbon type of motor, recognizing its innumerable advantages, and are prepared, through being equipped with the best of machinery and talent, to furnish something superior in every respect. Yours truly,

American Motor Co.,
Albert T. Otto, President.